

REMARKS

No new matter has been added in amending the specification or the claims. “ABS” [i.e., air-bearing surface] is found in paragraph 0042. On entry of the amendments to the specification, an ABS of FIG. 1B is indicated by reference numeral “60ABS.” Furthermore, that reference number “44” does not appear on replacement sheet 1/6 is consistent with the absence of reference number “44” in the text of the specification. Support for “and wherein the first and second conductive layers are not a same layer” is found, among other places, in FIG. 1A, which depicts as separate a first conducting layer that is longitudinal bias layer 40 and a second conducting layer that is lead layer 42, and in paragraph 0040, which notes longitudinal bias layer 40 being made of different materials than lead layer 42:

“In FIG. 1a, longitudinal bias layer 40 can be made of anti-ferromagnetic materials, such as NiMn, FeMn, PtPdMn, IrMn and PtMn. Lead layer 42 can be made of Ta, W or Ta/Au/Ta.”

In amending claim 1, applicants are not narrowing the claim’s scope. Rather, applicants are simply clarifying that the first and second conductive layers are not a same layer.

Office Action: Objection[s] to the Drawings

The Office Action mailed February 25, 2005 stated one objection to the drawings. A relevant second objection is stated in the most recent Office Action for related divisional application 10/317,878; this other Office Action was mailed January 25, 2005.

The first objection addressed the fact that sheet 1/6 includes a reference character (“44” in Fig. 2) that was not mentioned in the description. The second objection (from the most recent Office Action for related divisional application 10/317,878) noted that reference numeral “60” is used to reference both an ABS [i.e., air-bearing surface in FIG. 1B] and a GMR active device [i.e., a giant magneto-resistive or an AMR, i.e., anisotropic magneto-resistive, active device in FIGS. 4A & 4B].

Applicants' Response

In view of the amendments to the specification and drawings, applicants respectfully traverse the objections to the drawings.

Concerning the first objection, applicants respectfully maintain that this objection has been overcome by submitting replacement sheet 1/6. Reference number "44" does not appear on replacement sheet 1/6. This is consistent with the absence of reference number "44" in the text of the specification.

Concerning the second objection (from the most recent Office Action for related divisional application 10/317,878), applicants respectfully maintain that this objection has been overcome by amending the specification (e.g., replacing paragraph 0042) and the drawings (e.g., submitting replacement sheet 1/6) so that the air-bearing surfaces of FIG. 1B are indicated by numeral "60ABS." The reference number for the air-bearing surfaces of FIG. 1B (i.e., "60ABS") is distinct from the reference number for the GMR active devices of FIGS. 4A & 4B (i.e., "60").

Office Action: Claim Rejections

The Office Action stated a rejection of claims 1–5 and 8 as being anticipated under 35 USC 102(e) by US5442507 (Koga et al.). In particular, the Office Action notes (on page 3):

"Koga et al. discloses an MR head, as shown at least [in] FIGs. 3–6, including: a MR layer 106 having a first and second end; a SAL layer 104 having a first and second end; an insulating layer 105 of SiO₂ (for example-see co. 3, lines 30-31) having a thickness of 100-300 angstroms (for claim 8) arranged between the MR and SAL layers; first and second conductive (at least including layer 110, each contacting electrically both the MR layer and the SAL element at one end (see FIGS. 5 & 6). . . ."

The Office Action also stated a rejection of claim 9 as being obvious under 35 USC 103(a) over US5442507 (Koga et al.). The Office Action further admits (on page 4):

"Koga et al. remains expressly silent as the claimed (a) insulating layer being formed of Al₂O₃, although arguably could be included within the suggested 'or the like' (see col. 3, line 31) in the disclosure thereof. The insulating material Al₂O₃ is well known to be interchangeable with SiO₂

and substituting one for the other would have been within the level of a skilled artisan. . . .”

The Office Action also stated a rejection of Claims 1–5 and 8–9 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1–9 of US6583971. The Office Action only noted the element “an extending portion” (with respect to first and second conductive layers) as distinguishing the claims of the present application from those of the patent.

Applicants’ Response

Applicants respectfully traverse the rejection of claims 1–5 and 8 as being anticipated. Applicants also respectfully traverse the rejection of claim 9 as being obvious. Lead layer 110, which is disclosed in US5442507 (Koga et al.) as contacting electrically both the MR layer and the SAL element at one end, *is one layer* (see FIGS. 14 and 15 and the description at col. 6, lns. 32–36 of the formation of lead layer 110). Because US5442507 (Koga et al.) fails to disclose the claim element “first and second conductive layers [that] are not a same layer,” US5442507 (Koga et al.) does not anticipate claims 1–5 and 8. Because claim 9 also includes this element (through depending indirectly from claim 1) and US5442507 (Koga et al.) does not teach or suggest the element, claim 9 is not obvious in view of the patent. Applicants respectfully request that the rejection of claims 1–5 and 8 as being anticipated, as well as the rejection of claim 9 as being obvious, be withdrawn.

With regard to the rejection of the claims under the judicially created doctrine of obviousness-type double patenting, applicants respectfully request that this rejection be held in abeyance. That is, applicants respectfully request that a terminal disclaimer be required only after all other claim rejections have been withdrawn.

CONCLUSION

Applicants have responded to all issues raised in the Office Action mailed February 25, 2005. Applicants believe that all pending claims are in a condition for issuance and respectfully request issuance of a Notice of Allowance.

Applicants' undersigned representative earnestly requests a call at 713-951-3309 should an issue that may be addressed telephonically arise concerning this application.

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Respectfully submitted,

By *Mark J. Gatschet*

Mark J. Gatschet (Registration No. 42,569) for
Daniel G. Nguyen (Registration No.: 42,933)

JENKENS & GILCHRIST, A PROFESSIONAL
CORPORATION
5 Houston Center
1401 McKinney, Suite 2600
Houston, Texas 77010
(713) 951-3300
Attorneys For Applicant

APPENDIX 1: Annotated Sheet 1/6

1/6

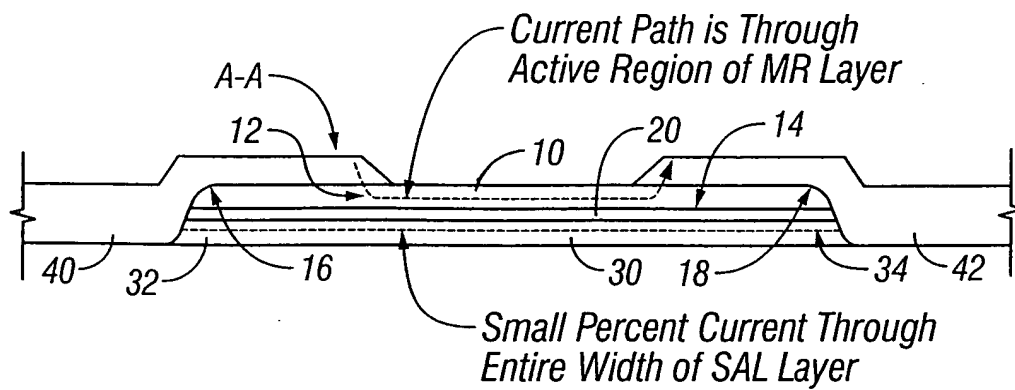


FIG. 1A

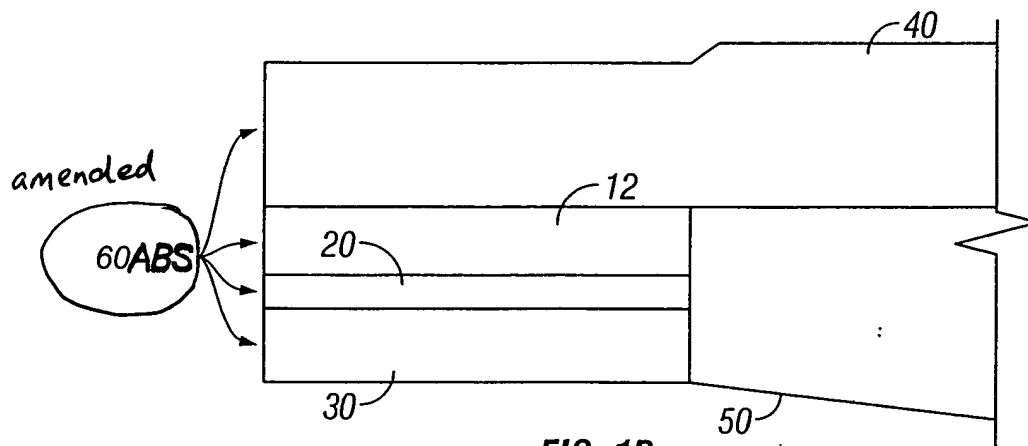


FIG. 1B

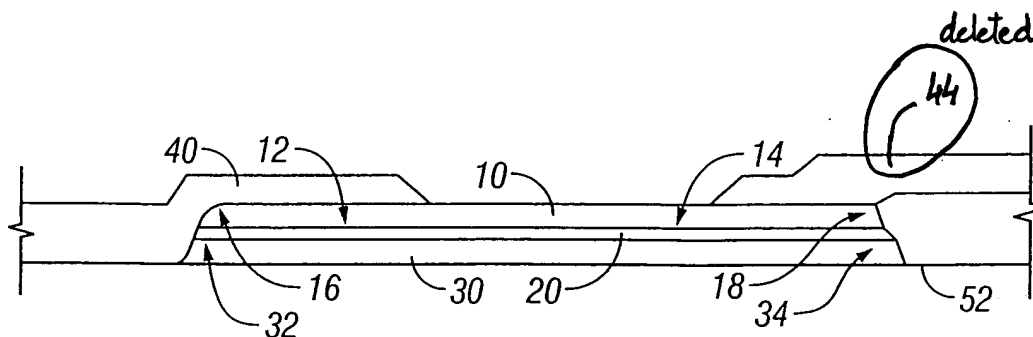


FIG. 2

AMENDMENTS TO THE DRAWINGS

In FIG. 1B of drawing sheet 1/6, please add “ABS” to reference numeral “60” and delete reference numeral “44.”

An annotated version of FIG. 1B with the changes indicated in red ink is attached in Appendix 1 along with a replacement sheet for drawing sheet 1/6 in Appendix 2.

APPENDIX 2: Replacement Sheet 1/6

Appendix 3: Clean Copy of the Pending Claims

1. A magnetic recording head, comprising:
 - a magnetoresistive layer having a first end and a second end;
 - a soft adjacent magnetic transverse bias layer (SAL) having a first end and a second end;
 - an insulating layer arranged between said magnetoresistive layer and said SAL;
 - a first conductive layer including an extending portion directly contacting a top surface of said magnetoresistive layer and electrically contacting said first end of said magnetoresistive layer and said first end of said SAL;
 - a second conductive layer including an extending portion directly contacting a top surface of said magnetoresistive layer and electrically contacting said second end of said magnetoresistive layer and said second end of said SAL;
 - the magnetoresistive layer supporting a first current path between the first and second conductive layers; and
 - the SAL supporting a second current path between the first and second conductive layers;
 - wherein the second current path is substantially longer than the first current path, and wherein the first and second conductive layers are not a same layer.
2. The magnetic recording head of claim 1, wherein said first current path passes through an active region in said magnetoresistive layer.
3. The magnetic recording head of claim 2, wherein said active region is formed between said first conducting layer extending portion, said magnetoresistive layer, and said second conducting layer extending portion.
4. The magnetic recording head of claim 1, wherein thickness of said magnetoresistive layer is more than 50 Å and less than 400 Å.
5. The magnetic recording head of claim 1, wherein thickness of said SAL is less than 500 Å, and the moment ratio of said SAL to said magnetoresistive layer ranges from 0.6 to 1.0.

8. The magnetic recording head of claim 1, wherein said insulating layer ranges from 50 Å to 200 Å in thickness.

9. The magnetic recording head of claim 8, wherein said insulating layer is formed of Al_2O_3 .